R5402N Series

Li-ion/polymer 1Cell Protector

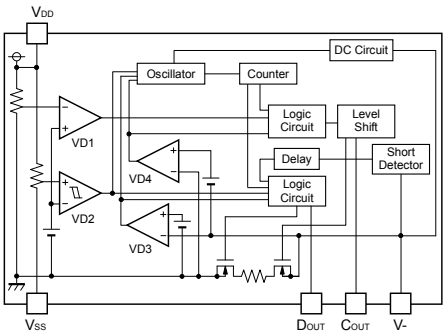
The R5402Nx Series are high input voltage CMOS-based protection ICs for over-charge/discharge of rechargeable one-cell Lithium-ion (Li-ion) / Lithium polymer excess load current, further include a short circuit protector for preventing large external short circuit current and excess charge/discharge-current.
Each of these ICs is composed of four voltage detectors, reference units, a delay circuit, a short circuit protector, an oscillator, a counter, and a logic circuit. SOT-23-5 package is available.

FEATURES

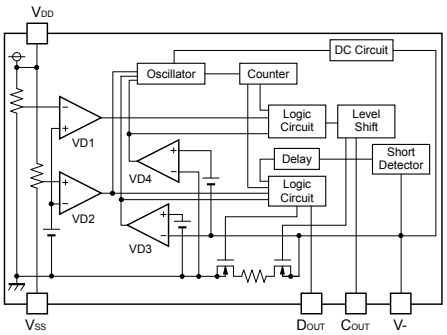
- Supply Voltage (V_{DD}) ····· 12V (Absolute Maximum Rating)
- Charger Negative Input Voltage (V-) ··· -35V (Absolute Maximum Rating)
- Operating Input Voltage Range (V_{DD}) ····· 1.5V to 5.0V
- Supply Current (I_{DD}) ····· Typ. 4.0µA
- Standby Current (I_S) ····· Max. 0.1µA (C Version)
  Max. 2.0µA (B, D Version)
- Over-charge (V_{DET1})
  - Detector Threshold Range ····· 4.0V to 4.5V (0.005V steps)
  - Detector Threshold Accuracy ··· ±25mV (25°C)
    ±30mV (-5 to 55°C)
  - Output Delay Time (tV_{DET1}) ····· Typ. 1.0s or 0.25s
- Over-discharge (V_{DET2})
  - Detector Threshold Range ····· 2.0V to 3.0V (0.1V steps)
  - Detector Threshold Accuracy ··· ±2.5%
  - Output Delay Time (tV_{DET2}) ····· Typ. 20ms
- Excess discharge-current (V_{DET3})
  - Detector Threshold Range ···· 0.05V to 0.20V (0.005V steps)
  - Detector Threshold Accuracy ····· ±15mV
  - Output Delay Time (tV_{DET3}) ···· Typ. 6ms or 12ms
- Excess charge-current (V_{DET4})
  - Detector Threshold Range ···· -0.1V
  - Detector Threshold Accuracy ····· ±30mV
  - Output Delay Time (tV_{DET4}) ···· Typ. 8ms or 16ms
- Short Protection
  - Voltage (V_{short}) ····· Typ. 0.8V
  - Output Delay Time (t_{short}) ····· Typ. 200µs or 300µs
- 0V-battery charge ····· Available
- Package ····· SOT-23-6

BLOCK DIAGRAMS

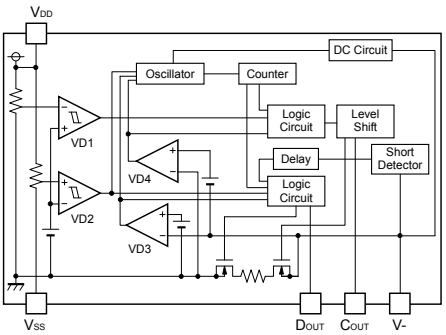
R5402NxxxxB



R5402NxxxxC



R5402NxxxxD



SELECTION GUIDE

Package	Quantity per Reel	Part No.
SOT-23-6	3,000 pcs	R5402Nxxx$*-TR-FE

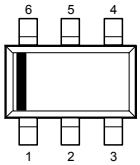
xxx: Serial Number for the R5402 Series designating input four threshold for over-charge, over-discharge, excess discharge-current, and excess charge-current detectors

$: Designation of Output delay time option of over-charge, excess discharge-current, and excess charge-current.
- (C) tV_{DET1}=1.0s, tV_{DET3}=12ms, tV_{DET4}=16ms
- (E) tV_{DET1}=1.0s, tV_{DET3}=6ms, tV_{DET4}=8ms
- (F) tV_{DET1}=0.25s, tV_{DET3}=12ms, tV_{DET4}=16ms
- (K) tV_{DET1}=1.0s, tV_{DET3}=12ms, tV_{DET4}=8ms

*: Designation of version symbols
- (B) With Latch function after Over-charge, Auto Release after Over-discharge
- (C) With Latch function after Over-charge and Over-discharge
- (D) Auto Release after Over-charge and Over-discharge

PACKAGE (Top View)

SOT-23-6



1	V_{OUT}
2	V-
3	C_{OUT}
4	NC
5	V_{DD}
6	V_{SS}

APPLICATIONS

- Li-ion / Li polymer protector of over-charge, over-discharge, excess discharge-current, excess charge-current for battery pack
- High precision protectors for cell-phones and any other gadgets using on board Li-ion / Li polymer battery